Nuclear Response and Emergency Environmental Surveillance Section Emergency Response Improvement Project

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South Carolina Department of Health and Environmental Control

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SCDHEC, L&WM, Waste Assessment & Emergency Response Division

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South Carolina Department of Health and Environmental Control

Problem Statement

The Department of Health and Environmental Control (SCDHEC) Nuclear Response and Emergency Environmental Surveillance (NREES) Section's response time, involving a full-activation of equipment, for a major Fixed Nuclear Facility (FNF) radiological release is too slow.

The SCDHEC NREES Section is responsible for responding to radiological emergencies in South Carolina and other southeastern states when needed. A radiological emergency would be any event caused by an accident or by a terrorist that resulted in an uncontrolled release of radiological material. Examples of an uncontrolled release could stem from an accident involving a FNF, a vehicle transporting radiological materials or a dirty bomb. A quick and efficient response will be needed by the NREES Section to help determine the magnitude of any radiological event and to minimize any radiological exposure the public may receive. This directly supports SCDHEC's mission of promoting and protecting the health of the public and environment.

Responding to small radiological accidents in the past such as plain crashes containing radiological pharmaceuticals, liquid tritium releases by the Savannah River Site or serving as technical experts for other agencies is always handled with equipment stored in two on-call response vehicles. However, responding to a major release from a FNF would require much more equipment to support additional positions not commonly manned during smaller radiological events. The ability to rapidly move the required

response equipment into place during FNF exercises creates the biggest challenge to the NREES Section.

Before this project, the response equipment needed for a full-activation FNF radiological emergency event such as sampling kits, radios, lap tops, printers, phones, maps, hand held instruments and portal-monitors were staged in several storage rooms located in Building 15 at the State Park Health Center and the SCDHEC Stern Building on Farrow Road. When participating in FNF drills, a minimum of four NREES staff members would require at least four hours of time to locate and load all the equipment required for the response. By staging and organizing all response equipment in one location, the NREES Section will be able to significantly decrease the amount of time and number of personnel needed to prepare for this type of response. This change, coupled with a modification on the NREES Section's Standard Operating Procedure (SOP), will help create an environment in which two staff members will only need 30 minutes to gather the equipment in preparation for a response. Hence, the goal of this project is to prepare for a full-activation response, utilizing two staff members, within 30 minutes of a request from the NREES Section Manager. This improvement in the NREES Section's response time for a full-activation will result in the Agency's ability to provide protection action guidelines faster and more accurately to the South Carolina Emergency Management Division, therefore better protecting the health of the public.

Data Collection

South Carolina has never been under a State of an Emergency due to a FNF release. Such an event would require a full-activation of the NREES Section's resources. Therefore, no data is available to demonstrate the efficiency of past responses to a radiological emergency of this magnitude. For that reason, we have to rely on data collected during the preparation of FNF exercises. During the past eight years the NREES Section as always required at least four hours for four staff members to load the response equipment in preparation for an exercise. Data from the past eight years is presented in the following table:

Time and Manpower Required to Respond to FNF Exercises

FNF Locations	Date	Time Spent (hrs)	Number of Staff
Oconee	Sept. 17, 1996	≥4	≥4
Plant Vogtle	Nov. 20, 1996	≥4	≥4
Plant Vogtle	July 16, 1997	≥4	≥4
VC Summers	Oct. 17, 1997	≥4	≥4
HB Robinson	Nov. 18, 1997	≥4	≥4
Plant Vogtle	June 24, 1998	≥4	≥4
VC Summers	July 21, 1999	≥4	≥4
HB Robinson	Dec. 7, 1999	≥4	≥4
Plant Vogtle	March 29, 2000	≥4	≥4
Catawba	July 25, 2000	≥4	≥4
Plant Vogtle	July 18, 2001	≥4	≥4
HB Robinson	Oct. 9, 2001	≥4	≥4
Oconee	Sept. 17, 2002	≥4	≥4
VC Summers	July 23, 2003	≥4	≥4
HB Robinson	Oct. 7, 2003	≥4	≥4
Catawba	March 16, 2004	≥4	≥4

Data Analysis

At the beginning of 2004, the NREES staff participated in an Unstructured Brainstorming Activity to identify various contributors to the slow deployment and possible methods to improve the NREES Section's response time for a full FNF deployment. Over the course of a couple of weeks, the major contributing factor was determined to be the lack of space to organize and stage all the response equipment. Consequently, a temperature control space was identified as the primary need for the NREES Section. Other needs consisted of lockable cabinets for instruments, a table to serve as a work area, and a place to conduct on-site training.

Possible solutions identified consisted of the modification of two office cubicles to stage and store equipment, the continued practice of assigning various instruments/equipment to different staff members, or the idea of cross-training staff members on the exact location of every piece of equipment. Finally, a decision was made to re-locate all the response equipment into one common room or area. Re-locating all the response equipment into one room would help the NREES Section to organize the equipment in a central location so that all staff members would have unlimited access to all response equipment. This would ultimately result in an efficient process for gathering and loading all the equipment in the event of a full-activation response.

Implementation Plan

Eventually, two rooms in Building 15 at the State Park Health Center were identified to help overcome the challenge of staging all the NREES Section's response equipment at one location. At the time, the two rooms contained miscellaneous equipment, outdated materials and filling cabinets. Upon request, Mr. Harry Mathis, SCDHEC Land and Waste Management Assistant Bureau Chief, granted permission to perform the necessary renovations to Building 15 for this project. The memorandum granting permission is located in Appendix A. Once the renovations are completed, the NREES Section would relocate all the response equipment to Building 15 for equipment staging and training activities.

After the two rooms were vacant, a list of renovations was developed. Renovations that needed to be performed to the two rooms consisted of removing the flaking lead-based paint, installing additional lights, installing heat-pump window units, repairing the double doors that were painted shut, and replacing the windows. As a result, the following action steps were developed:

1. Complete renovations to Building 15- To be completed by the State Park Health Center Maintenance Department.
2. Modify current SOP- To be completed by the Project Manager.
3. Organize all equipment in Building 15 by response position- To be completed by the Project Manager and one other NREES staff member.

4. Store laptops and other temperature sensitive equipment in lockable cabinets located inside Building 15- To be completed by the Project Manager and one other NREES staff member.
5. Test the NREES Section's response efficiency (Time Efficiency Measure) with timed drills. The goal is to have all required response equipment loaded and ready to leave Columbia, by two staff members, within 30 minutes of a request made by the NREES Section Manager. The NREES Section Manager will complete this evaluation.

Evaluation

The biggest obstacle to this project was completing the renovations to Building 15 (Action Step 1). The NREES Staff provided the manpower to clean out the two rooms in preparation for the renovations. Once the rooms were vacant, the State Park Health Center Maintenance Department was able to make an assessment regarding the needed repairs.

The State Park Health Center Maintenance Department agreed to cover the flaking lead paint with sheet rock on the walls, install drop-down ceilings and install two heat pumps for climate-control. The cost for these modifications were as followed:

1. Walls and ceilings (sheet rock, ceiling lights, ceiling tile, molding, two windows and wire)- $1500
2. Two heat pumps- $1500

Renovations to the two rooms were completed in August. The two lockable, metal storage cabinets, 6 tables and 12 chairs all arrived in November. The total cost for these items were $1550.93. Therefore, a total of $4550.93 was spent renovating two rooms in Building 15. Before and after pictures of the two renovated rooms are located in Appendix B.

To complete the second action step, the Appendix IV of the State Technical Radiological Emergency Response Plan was modified to reflect the new location of the NREES Section's response equipment. A copy of Appendix IV is located in Appendix C. The modified version of Appendix IV will be submitted to the NREES SOP Review Committee for approval.

Due to an equipment purchase, the third action step will not be completed until March of 2005. Initially, the intention of this project was to relocate all the NREES Section's response equipment inside Building 15. However, a large enclosed equipment trailer has been recently purchased and received for the purpose of storing all non-temperature sensitive response equipment. Non-temperature equipment consists of items such as maps, pocket dosimeters, sampling and anti-contamination equipment. The additional time will be required to install cabinets and shelves in the equipment trailer for storage. Installing cabinets and shelves will maximize the space in the trailer, therefore allowing the NREES Section to efficiently store more response equipment in the trailer instead of inside Building 15. By storing all non-temperature sensitive equipment in the trailer, a

full-activation response should be faster since the only materials needed from Building 15 will be the handheld radiation monitoring instruments and laptops.

Action step number four was completed in November after the arrival of the lockable metal storage cabinets. The handheld radiation monitoring instruments, laptops and GPS unit have been moved from the Stern Building to Building 15 at the State Park Health Center.

The final action step will take place after the modifications to the rad trailer has been completed. The NREES Section Manager has agreed to randomly test staff on the timeliness of a response preparation for a full-activation of all emergency equipment.

The release form for this project is located in Appendix D.

Appendix A: Permission Letter for Building 15 Renovations

Memorandum

Date: April 23, 2004

To: Harry Mathis, Land & Waste Management, Assistant Bureau Chief OK 4/24/04

From: Michael Moore, Nuclear Response and Emergency Environmental Surveillance Section, Building 15 Renovation Project Manager MSM

Thru: Sandra Threatt, Nuclear Response and Emergency Environmental Surveillance Section Manager

Re: Building 15 Project Proposal

This is to request your review and approval of renovations to building 15, State Park Facility.

Purpose

The purpose of this project is to improve the agencies response time to nuclear events and to provide a permanent training area for nuclear emergency operations.

Background and Future Plans

Building 15 (Bldg 15) was built in the 1950s as part of the State Park Health Facility. In the early 1990s, the Division of Emergency Response and Waste Assessment began using this building as a staging location for chemical emergency response and sample collection activities. The NREES Section would like to use two of the remaining three unused rooms for staging equipment needed for nuclear emergencies/drills, and for training nuclear emergency responders.

Currently, the equipment needed for nuclear emergency events, such as sampling kits, radios, lap tops, printers, phones, maps, hand held instruments and portal-monitors are staged in several locations in Bldg 15 and the Stern Building. When participating in nuclear exercises, 3 to 4 NREES staff members spend at least an hour locating and loading all the equipment required for a response. By staging and organizing all response equipment in one location, the NREES Section will be able to significantly decrease the amount of time and number of personnel needed to prepare for a response. This change, coupled with a "First In" SOP, will help create an environment in which two staff members will only need 30 minutes to gather the equipment in preparation for a response. This improvement in the NREES Section's response time will result in the Agency's ability to provide protective action guidelines faster and more accurately to the SC EMD, therefore better protecting the health of the public.

We propose to use the second of the three available rooms in Bldg 15 as a training room for nuclear responders assigned to Field Teams, the Forward Emergency Operations Center, the Emergency Operation Facility or the State Emergency Operations Center positions. The NREES Section has enough staff to man most positions for 12 to 24 hours with the exception of field teams. Currently, DHEC does not have a permanent field sampling team for nuclear events. Therefore, the NREES Section is constantly training various DHEC employees on how to properly collect radiological samples, while protecting themselves from undo exposure to radiation. In the past, the lecture part of the field team training has taken place in the Stern Building and the hands-on part of the training was taught at Bldg 15. By finishing the second room in Bldg 15, training will be provided to nuclear emergency responders at one location. The advantages of this change for staff and trainees would be fewer interruptions, a permanent sampling practice location, less transporting of equipment, and flexible room scheduling.

Building Improvements

Needed improvements to Bldg 15 primarily consist of covering the flaking lead paint with sheet rock and adding two heat pumps for climate-control. Bob Martin and his staff performed a project review and cost estimate. Mr. Martin agreed to the renovations pending EQC approval and funding. The following is an estimated cost for the renovations:

1. Walls and ceilings (sheet rock, ceiling lights, ceiling tile, molding, and wire)- $1500.

2. Heat pumps- $1500.

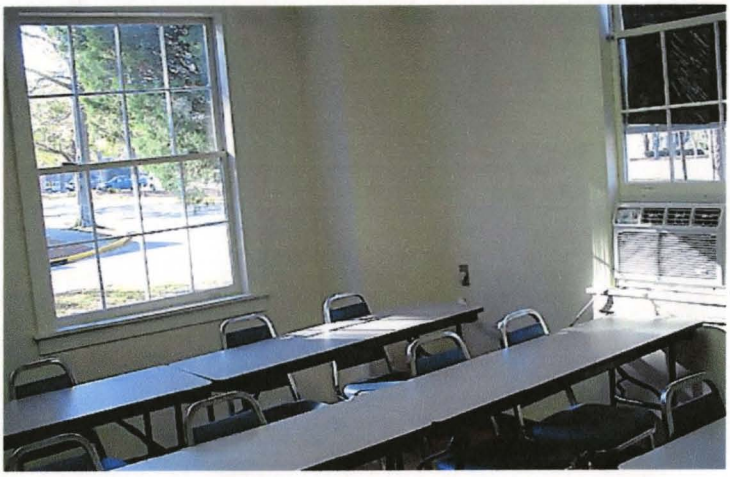
We will use 4AD20 S330 "other funds" for this project.

cc: R. Kinney

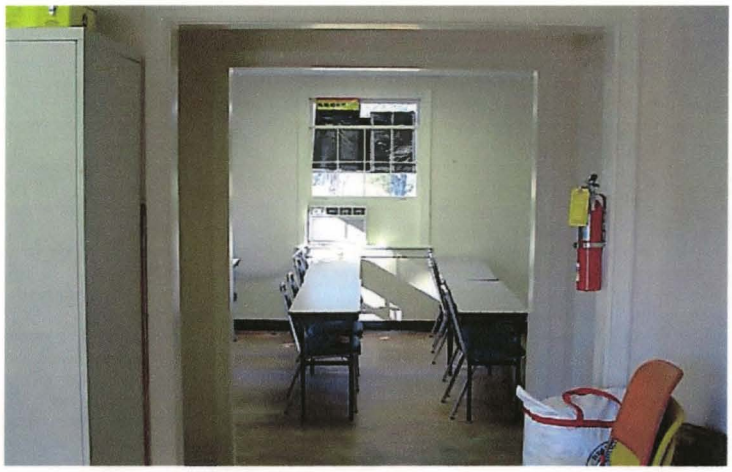
Appendix B: Before and After Pictures of the Two Renovated Rooms in Building 15 at the State Park Health Center

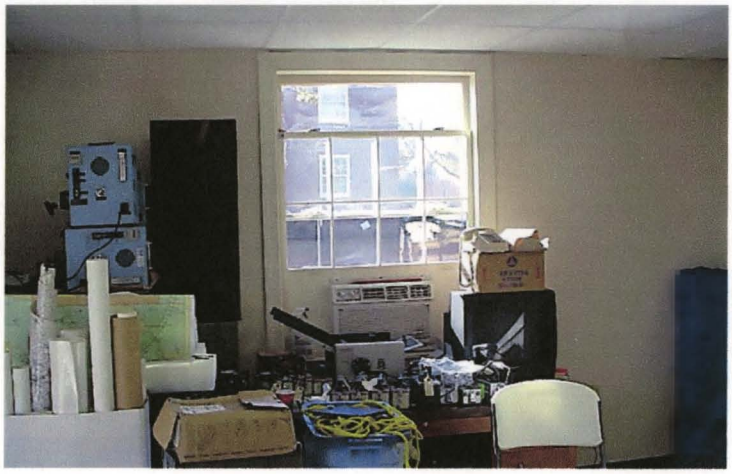
Before Renovations:

After Renovations



After Renovations Continue





Appendix C: Updated State Technical Radiological Emergency Response Plan, Appendix IV: Emergency Equipment and Supplies

SOUTH CAROLINA

TECHNICAL RADIOLOGICAL EMERGENCY RESPONSE PLAN

APPENDIX IV

EMERGENCY EQUIPMENT AND SUPPLIES

BUREAU OF LAND and WASTE MANAGEMENT

S.C. DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

January 2005

APPENDIX IV, EMERGENCY EQUIPMENT AND SUPPLIES

I. GENERAL

The Bureau of Land and Waste Management, S.C. Department of Health & Environmental Control maintains appropriate levels of portable radiation monitoring instruments, laboratory counting instruments, field sampling equipment, and supplies to conduct the operations of its normal (emergency) radiological health activities. In addition, radiation monitoring instrumentation and supplies are maintained by the Bureau as described on the following pages.

II. INSPECTION AND INVENTORY

Emergency Kits, Portable Survey Instruments, Sampling Equipment, Radios, Supplies and Material are inspected quarterly. An inventory of supplies is conducted at that time. Portable survey instruments and radio units are operationally checked monthly and after each use.

III. CALIBRATION OF SURVEY INSTRUMENTS

Radiation survey instruments are calibrated at least every twelve months.

APPENDIX IV, EMERGENCY EQUIPMENT AND SUPPLIES

ITEM/DESCRIPTION	LOCATION
Survey Instruments and Dosimeters	
G-M Instruments	Building 15
RAD IDs	Building 15
Pressurized ion chamber detectors (CDV-715)	Building 15
ICS-4000s	Building 15
Eberline 600s	Building 15
FH-40 Dose Rate Unit	Building 15
Pocket dosimeters (200mr, 5R, 100R, 200R) and Chargers	Rad Trailer
Digital dosimeters	Building 15
Portal Monitors	Rad Trailer & ER Decon Trailer
Communications Equipment	
Satellite Phones	Building 15
800 MHz Radios	Building 15
Transportable base station	Rad Trailer
Transportable base station antenna	Building 15

APPENDIX IV, EMERGENCY EQUIPMENT AND SUPPLIES

ITEM/DESCRIPTION	LOCATION
Emergency Team Kits	
Instrument Kit	Each response vehicle
Anti-Cs	Each response vehicle
Sampling Equipment	Each response vehicle
KI	Each response vehicle
Digital dosimeters	Each response vehicle
SOPs	Each response vehicle
FEOC Equipment	
Maps	Rad Trailer
FEOC Director Kit	Rad Trailer
Field Team Director Kit	Rad Trailer
Field Team Kits	Rad Trailer
Computer with Dose Exposure Spreadsheet	Building 15
Computer with RASCAL	Building 15
Air Samplers	Rad Trailer
Emergency and Drill TLDs	Building 15
Emergency and Drill Silver Zeolite Cartridges	Building 15
Extra Anti-Cs and Sample Containers	Rad Trailer
Ki	Rad Trailer
Administrative supplies	Rad Trailer

APPENDIX IV, EMERGENCY EQUIPMENT AND SUPPLIES

ITEM/DESCRIPTION	LOCATION
Laboratory Equipment	
Multi-channel analyzer with GeLi detector	Each response vehicle
Thermoluminescent dosimeter reader	
G-M detector with scalar	
Air sampler, Hi-vol	
Liquid Scintillation	
Contamination smears with envelopes	
Gloves, plastic	
Anti-Cs	
Administrative supplies	

POTASSIUM IODIDE (KI) DISTRIBUTION IN S.C.

York County Health Department - 4200 doses

Darlington County Health Department - 4200 doses

Chesterfield County Health Department - 1400 doses

Lee County Health Department - 1400 doses

Lexington County Health Department - 2800 doses

Oconee County Health Department - 4200 doses

Pickens County Health Department - 1400 doses

Aiken County Health Department - 1400 doses

Allendale County Health Department - 1400 doses

Barnwell County Health Department - 1400 doses

York County EOC - 4200 doses

Bureau of Land and Waste Management - 72,800 doses

Appendix D: CPM Release Form

CPM PROJECT COURSE

Office Of Human Resources

I release the materials submitted and final copy of my CPM project paper for reproduction, distribution, publication or other educational purposes by the Office of Human Resources.

Signature: Mutrah S. Moore

Name: Nuclear Response and Emergency Environmental Surveillance Section Emergency Response Improvement Process